apparent especially in chemical laboratories, drug stores, manufacturing and other establishments where liquids and various solutions are in constant use. In transferring corrosive poisons or valuable liquids it obviates liability to accident or waste. It should also have a wide application in the filling and emptying of all sizes of storage-battery jars. It is at present being used for siphoning beer from kegs and wine from barrels. When a solution is to be kept "on tap" for instant use a stopcock may be provided. These siphons in addition to glass are being made of brass, copper, zinc, lead, iron, hard rubber, etc.

When the self-starting attachment is sealed to a straight tube ending in a capillary, a very efficient intermittent Hero's Fountain is obtained, as shown in Fig. 2.

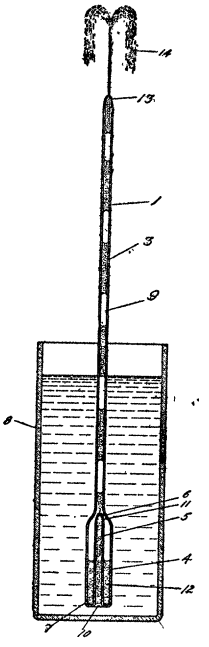

FIG. 2.

Application for patent rights has been made in the name of the inventor, Gustavus A. Storm, but all rights, title and interest in the same has been assigned to the Standard Scientific Company of New York.

P. B. PERKINS

BROWN UNIVERSITY

THE AMERICAN PHILOSOPHICAL SOCIETY

AT the annual general meeting of the society held in Philadelphia from April 13 to 15, the address of welcome was made by the President, Dr. W. W. Keen, who, with Vice-presidents W. B. Scott, George E. Hale and Albert A. Michelson, presided. This meeting is a notable event among scholars and over forty papers were presented in the sciences and in the humanities. The national crisis also received some attention, Dr. M. T. Bogert, of Columbia University, outlining the work chemists may do to aid the National Research Council in the solution of certain war problems. Proper insignia to identify "members of the industrial army" so they may not be called slackers was urged. Attention was called to England's sad mistake in permitting general enlistment for "the front" when in many cases men with special ability could have been of so much more value using their brains in the laboratory. A well-trained industrial army is just as important as the army of fighters. The program with a number of abstracts follows.

APRIL 12

William W. Keen, M.D., LL.D., President, in the chair

The trial of animals—a little known chapter of medieval jurisprudence: HAMPTON L. CARSON, LL.D., Philadelphia.

Medieval sermon-books and stories and their study since 1883: THOMAS FREDERICK CRANE, Ph.D., Litt.D., professor emeritus of the Romance languages and literature, Cornell University.

Some recent acquisitions to the Yale collection: ALBERT T. CLAY, LL.D., professor of Assyriology and Babylonian literature, Yale University.

Vision as a physical process: HERBERT E. IVES, Philadelphia. (Introduced by Dr. A. W. Goodspeed.)

The diagnostic method of training intelligence: an education for the fortunate few: LIGHTNER WITMER, Ph.D., director of the Laboratory of Psychology, University of Pennsylvania.

Historical notes on "the armament of Igor": J. DYNELEY PRINCE, Ph.D., professor of Slavonic languages, Columbia University.

A new translation of the Hebrew Bible: CYRUS ADLER, Ph.D., president of Dropsie College for Hebrew and Cognate Learning, Philadelphia.

APRIL 13

George Ellery Hale, Ph.D., Sc.D., LL.D., F.R.S., Vice-president, in the chair

Lighting in its relation to the eye: Clarence E. Ferree, Ph.D., professor of psychology, Bryn Mawr College. (Introduced by Dr. W. W. Keen.)

The work of which this paper is a brief outline was done under the auspices of the American Medical Association's subcommittee on the hygiene of the eye, of which Dr. William Campbell Posey, of this city, is chairman. The object of the work has been to compare the effect of different lighting conditions on the eye and to find the factors in a given lighting situation which cause the eye to lose in efficiency and to experience discomfort. In all, forty-two different lighting situations have been investigated, selected with special reference to the problem in hand. Also a number of miscellaneous experiments have been conducted pertaining to the hygienic employment of the eye. Tests were made to determine the eye's aggregate loss in functional activity and to analyze this effect. In all seven different types of tests were used.

Factors influencing the sex ratio in the domestic fowl: Raymond Pearl, Ph.D., biologist, Maine Agricultural Experiment Station, Orono, Maine.

The problem of the sex ratio is one of the most important of biology from the theoretical standpoint as well as from that of the practical breeder or farmer. The desire to control the proportions of the sexes produced is one which has excited mankind through the ages. Thanks primarily to the work of certain American biologists, notably Professor C. E. McClung, of the University of Pennsylvania, and Professor E. B. Wilson, of Columbia University, the key to the riddle of sex has at last been found. It is well known that in a wide range of animals there is a definite hereditary mechanism which irrevocably determines the sex of the individual. While it is true that a definite mechanism controls the determination of sex, yet there has appeared a great deal of evidence recently, of varying degrees of trustworthiness, that sex ratios may be experimentally modified and controlled. It is the purpose of this paper to examine the sex production question in the common fowl, and see to what conclusions it leads. In the present war conditions any information which would make it possible for the poultryman or farmer to produce a larger number of pullets to lay eggs without producing so many cockerels to eat up costly food, would be of very great value. This study, which is based on eight years' experiments, and over 22,000 individuals, demonstrates first that the determination of sex in poultry is primarily a matter of a definite, hereditary mechanism, just as it is in insects and other forms which have been studied. At the same time, it is demonstrated that under certain physiological circumstances the operation of this mechanism may be modified in such a way as to lead to the production of more females, in proportion to the number of males. The chief factor in bringing about the modification in the direction of a larger production of females is the fecundity or laying ability of the hens used as breeders. The larger the number of eggs which a hen lays before being put into the breeding pen, the larger will be the proportion of females and the smaller the proportion of males produced by her eggs. Some years ago it was shown by the speaker that the ability to lay eggs (fecundity) in poultry is a matter of definite Mendelian inheritance. As a result of this knowledge, it is possible to breed strains of hens in which high productivity is a definitely fixed characteristic. The present results taken in connection with the earlier ones show that when the poultryman breeds along the right lines for increased egg production, he will at the same time be producing a strain in which profit making pullets preponderate in place of the less profitable cockerels.

Significant results of scientific investigations applied to fishery problems: Hugh M. Smith, M.D., LL.D., commissioner of fisheries, Washington, D. C. (Introduced by Dr. Clarence E. McClung.)

A description of a new photographic transit instrument: Frank Schlesinger, Ph.D., director of the Allegheny Observatory, University of Pittsburgh.

In many departments of astronomy it has been found that visual methods can advantageously be replaced by photographic. This experiment is an attempt to make a similar substitution in the case of the determination of star places. The experiment is a timely one, since astronomers are confronted with the necessity for observing the places of many stars, this necessity arising out of the recent striking developments in the matter of star-streaming.

Probable masses of comets: Henry Norris Russell, Ph.D., professor of astronomy, Princeton University.

The relationship of stellar motions to absolute magnitudes: Walter S. Adams, A.M., Sc.D., assist-

ant director of Mt. Wilson Solar Observatory, Pasadena, Calif., and G. STRÖMBERG.

The spectroscopic method of deriving the absolute magnitudes of stars and a new formula connecting parallax and proper motion have been utilized to study the relationship between the motions of stars and their true or absolute magnitudes. About one thousand stars have been used in the investigation. The results establish almost certainly a definite increase of velocity with decrease in brightness. In radial velocity this is of the order of 1.5 kilometers for each magnitude for stars of the F, G, K and M types of spectrum. This is to be interpreted, probably in part at least, as an effect of mass: that is, the smaller stars move more rapidly than the larger stars. This increase of velocity with decrease in brightness is found to persist among the groups of stars arranged according to their distance from the sun. Accordingly the evidence does not indicate that the nearer stars are moving more rapidly than the distant stars.

Nebulæ: V. M. SLIPHER, Ph.D., director of the Lowell Observatory, Flagstaff, Arizona. (Introduced by Professor C. L. Doolittle.)

Early man in America: EDWIN SWIFT BALCH, A.B., Philadelphia.

The present status of knowledge about early man in America may be summed up as follows. Early man was here. He lived during at least a part of the Pleistocene period for tens of thousands of years south of the glacial moraines. He probably went through an Eolithic period and certainly through a Chelleen period in some places and therefore was truly a Paleolithic man. He may have made rudimentary fine art. Paleolithic American man was the ancestor of the Neolithic historic Indian and although less advanced in culture much like his descendant in anthropological characteristics. Whether he was an autochthone in America or whether he came from some other place and if so when, we do not as yet know positively, although his affiliations seem to be to the west. And it is to four men above all others that we owe our knowledge: Abbott, the discoverer of paleolithic implements and horizons; Volk, the corroborator; Lund, the first finder of probably Paleolithic bones, and Winchell, the investigator of patination.

The influence of the admixture of present immigrant races upon the more original stock: CHARLES B. DAVENPORT, S.B., Ph.D., director, Station for Experiment Evolution, Cold Spring Harbor, Long Island.

A new Babylonian account of the creation of man: GEORGE A. BARTON, Ph.D., LL.D., professor of biblical literature, Bryn Mawr College.

The waters of death: PAUL HAUPT, professor of Semitic philology, Johns Hopkins University.

APRIL 13

Albert A. Michelson, Ph.D., Sc.D., LL.D., F.R.S., Vice-president, in the Chair

Crushing of crystals: PERCY W. BRIDGMAN, assistant professor of physics, Harvard University.

Hollow cylinders cut from single crystals have been subjected to unique tests by applying large hydrostatic pressures to the external surface. The crushing strength under these conditions is much higher than that found by ordinary tests, and the manner of failure is different. This has an interesting geological significance in suggesting that open cavities may persist in the earth's crust at greater depths than could be expected from the usual methods of measurement.

Structure of the spectra of the phosphorescent sulphides (describing measurements by Drs. H. E. Howe, H. L. Howes and Percy Hodge): EDWARD L. NICHOLS, Ph.D., D.Sc., LL.D., professor of physics, Cornell University.

The Corbino effect in liquid mercury: EDWIN PLIMPTON ADAMS, Ph.D., professor of physics, Princeton University.

Spontaneous generation of heat in recently hardened steel: CHARLES FRANCIS BRUSH, Ph.D., Sc.D., LL.D., Cleveland.

I., Condensation and evaporation of metal films; II., The minimum potential for excitation of the "D" lines of sodium: ROBERT WILLIAMS WOOD, A.B., LL.D., professor of experimental physics, Johns Hopkins University.

Growth and imbibition: D. T. MACDOUGAL, Ph.D., LL.D., director of department of botanical research, Carnegie Institution of Washington, and H. A. SPOEHR.

The mechanism of overgrowth in plants: ERWIN F. SMITH, B.S., Sc.D., Bureau of Plant Industry, Department of Agriculture, Washington, D. C.

The behavior of self-sterile plants: EDWARD M. EAST, Ph.D., professor of experimental plant morphology, Harvard University.

There are really two problems connected with the inheritance of self-sterility in plants. One is the relation between self-sterile and self-fertile plants, the other is the behavior of self-sterile

plants when crossed together. They should not be confused. The *Nicotiana* self-fertility is completely dominant over self-sterility. Either of the self-sterile species *Nicotiana alata* or *Nicotiana forgetiana* may be crossed with the self-fertile species *Nicotiana langsdorffii*. The result in each case is an F_1 generation that is completely self-fertile. The F_2 plants show the usual monohybrid ratio of 3 self-fertile to 1 self-sterile. Given the basic factor for self-sterility in the homozygous condition as in the case in *Nicotiana forgetiana* and *Nicotiana alata*, two plants may be either *cross-fertile* or *cross-sterile* with each other. Reciprocal crosses always give the same result. Thus the character behaves as if it were sporophytic rather than gametic. In other words, the constitution of the mother plants and not the constitution of the gametes which they produce determines whether a combination shall be fertile or sterile. This fact indicates very strongly that gametes have no other function than fusion with their complements, that the potential characters which they carry are wholly latent until the development of the zygote begins. The cross-sterility shown is of such a nature that if plant A is sterile with plants B and C, plant B must be sterile with plant C. Generalizing upon the basis of the behavior of self-sterile plants in intercrosses one may say that a self-sterile population consists of a small number of groups of plants each plant being cross-sterile with all plants belonging to the same group and cross-fertile with all plants of all other groups. These facts naturally lead to the conclusions that the behavior of self-sterile plants in inter-crosses is regulated by several transmissible factors all of which are distinct from the single basic factor for self-sterility and which presumably may be carried by self-sterile plants. A plant homozygous for self-sterility can neither be fertilized by its own gametes nor by the gametes of any other self-sterile plant of like constitution as regards these regulation factors, but any two plants differing in these regulatory factors are cross-fertile.

Twin hybrids from Œnothera lamarckiana and franciscana when crossed with Œnothera pycnocarpa: George F. Atkinson, head of the department of botany, Cornell University.

Œnothera lamarckiana × *Œ. pycnocarpa.* There is a splitting in the F_1 with production of twin hybrids. One of the twins (*pycnocarpa* type) has rosette leaves narrow and deeply cut over the basal half as in *Œ. pycnocarpa,* but the leaves are strongly crinkled as in *Œ. lamarckiana.* The other twin (*lamarckiana* type) has rosette leaves, narrow furrowed, not crinkled as in *Œ. pycnocarpa,* but with plain edge as in *Œ. lamarckiana.* The rosettes of the *pycnocarpa* type strongly resemble those of *Œ. pycnocarpa* because of narrowness and cutness, while at the same time they resemble *Œ. lamarckiana* in convexity and crinkledness. The general appearance of the rosettes of the *lamarckiana* type suggests neither parent, since the factors selected represent the less striking character of each. These two twin types are fixed in the first generation, since they are repeated in the F_2 and probably in the following generations in accord with the usual behavior of twin hybrids determined by de Vries. The progeny is remarkably uniform, in that respect following the feature of uniformity in the progeny of the parents, except for an occasional mutant from the *pycnocarpa* type. This mutation factor is probably inherited from *lamarckiana.* *Œnothera franciscana* × *Œ. pycnocarpa.* There is a splitting in the F_1 with production of twin hybrids. One of the twin hybrids (*pycnocarpa* type) has rosette leaves with the narrowness and cutness of *Œ. pycnocarpa,* but otherwise modified by *Œ. franciscana.* The other twin has rosettes very similar to those of *Œ. franciscana,* somewhat modified by *Œ. pycnocarpa,* and showing considerable fluctuating variations, parallel with those of *Œ. franciscana.* In the F_2 generation there is a one-sided splitting similar to that which occurs in the F_2 of twins from *Œ. hookeri* × *Œ. lamarckiana* described by de Vries. The *pycnocarpa* type twin has a hybrid constitution and in the F_1 splits into two types, the *pycnocarpa* type and the *franciscana* type, the latter presenting fluctuating variations parallel with those in the parent *franciscana.* The other twin (*franciscana* type) is fixed in the F_1 since it repeats itself in the F_2 and probably in the succeeding generations, but it presents the fluctuating variations characteristic of the parent *franciscana.* The *franciscana* twin probably carries the *pycnocarpa* factors also, but in a subordinate or permanently latent condition. If so, it is a physiological homozygote. If it is possible to introduce a splitting factor into the *franciscana* twin by an appropriate cross, and cause the *pycnocarpa* character to reappear in some of the progeny, the fundamental heterozygotic constitution of the *franciscana* twin would be demonstrated.

Arthur W. Goodspeed,
Secretary

(*To be continued*)